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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/061,800	01/30/2002	Svetlana V. Shchegrova	10010464-1	1874

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AGILENT TECHNOLOGIES, INC.  
Legal Department, DL429  
Intellectual Property Administration  
P.O. Box 7599  
Loveland, CO 80537-0599

EXAMINER
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SHIBUYA, MARK LANCE

ART UNIT	PAPER NUMBER
1639	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	02/27/2007	PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/061,800	<b>Applicant(s)</b> SHCHEGROVA ET AL.	
	<b>Examiner</b> Mark L. Shibuya, Ph.D.	<b>Art Unit</b> 1639	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 6/15/06.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-33 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-33 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                                | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                       | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

### **DETAILED ACTION**

1. Application: 10/061,800. Claims 1-33 are pending and examined.
2. The examiner of record has changed.

### **Former Final Rejections Reversed**

3. In the Decision of the Board of Patent Appeals and Interferences, mailed 10/31/2006, (hereinafter "Decision"), the final rejections on appeal were reversed completely, (Decision at p. 2).

### **Reopening of Prosecution**

4. Prosecution on the merits of this application is reopened on claims 1-33, which are considered unpatentable for the reasons indicated below:

The MPEP, in part, states:

If the examiner has specific knowledge of the existence of a particular reference or references which indicate nonpatentability of any of the appealed claims as to which the examiner was reversed, he or she should submit the matter to the Technology Center (TC) Director for authorization to reopen prosecution under 37 CFR 1.198 for the purpose of entering the new rejection. See MPEP § 1002.02(c) and MPEP § 1214.07. The TC Director's approval is placed on the action reopening prosecution.

MPEP at 1214.04.

In the Decision, the Board of Patent Appeals and Interferences, (hereinafter "the Board") did not enter a new ground of rejection. However, the Board, in regard to other

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issues, listed printer technology prior art that the Board stated should be considered by examiner before allowance of the application for issue as a patent, (see, Decision at p. 17, citing Kumar et al., U.S. Patent No. 6,283,572 issued Sept. 4, 2001, for "Dynamic Multi-Pass Print Mode Corrections to Compensate for Malfunctioning Inkjet Nozzles" (Figure 7, Tables I and II, in particular); Anderson, U.S. Patent No. 6,076,910 issued June 20, 2000, for "Ink Jet Printing Apparatus having Redundant Nozzles" (claim 13, in particular); and Hackleman, U.S. Patent No. 5,640,183 issued June 17, 1997, for "Redundant Nozzle Dot matrix Printheads and Method of Use.").

Furthermore, the Board stated that "[i]t would have been reasonable for one skilled in the art to look to the field of printer technology at the time of invention given that microarray production companies were innovating with concepts borrowed from printer technology as early as 1998", (Decision at p. 17, citing further Industrial Technology Research Institute News Release "Implementation of Phalanx Microarray Technology--Fruition of ITRI's Multidisciplinary Effort in Biotechnology," <http://www.itri.org.tw/eng/news/spotlight-show.jsp?path=f-20030409.dcr>; ArrayJet History, <http://www.arraviet.co.uk/about.html>; MacBeath, "Printing Proteins as Microarrays for High-Throughput Function Determination," Science, New Series, col. 289, No. 5485 (Sep. 8, 2000), pp. 1760-1763; and Shimadzu Biotech Press Release October 2001, "Proteome Systems and Shimadzu Biotech Complete 1<sup>st</sup> Stage of the Chemical Printer Development," [http://www.shimadzu-biotech.net/pages/news//press\\_releases/2001\\_10\\_a\\_proteome.php](http://www.shimadzu-biotech.net/pages/news//press_releases/2001_10_a_proteome.php)).

In view of these various references made of record by the Board, (IDS, entered 10/31/2006, in the Appendix of the Decision), and the admonition by the Board to the examiner to consider these said references before allowance, the instant examiner has submitted the matter to the TC Director for authorization to reopen prosecution with new grounds of rejection, (see, Conclusion below).

The instant examiner is respectfully mindful that the MPEP, in part, states:

The examiner should never regard such a reversal as a challenge to make a new search to uncover other and better references. This is particularly so where the application or ex parte reexamination proceeding has meanwhile been transferred or assigned to an examiner other than the one who rejected the claims leading to the appeal. The second examiner should give full faith and credit to the prior examiner's search.

MPEP at 1214.04.

### **Priority**

5. The instant application, 10/061800, was filed 01/30/2002.
6. The examiner respectfully notes that a previous rejection over of claims 1-33 under 35 USC 102(a), as being anticipated by Agilent Technologies Inc. (Agilent) (GB 2,355,716 A), was withdrawn before appeal, (see, Final Rejection, mailed 6/2/2005, at p. 7), in consideration of the Declaration, entered 3/25/2005, which was filed pursuant to C.F.R. §1.131. In arguments, entered 3/25/2005, appellant's representative stated that the said Declaration demonstrated that the present application was invented prior to February 5, 2001.

### **Claim Rejections - 35 USC § 112**

7. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

8. Claims 1-33 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1, and its dependent claims, recite the limitation "each set" in line 11. There is uncertain antecedent basis for this limitation in the claim because it is unclear whether "each set" refers to the "at least one set of redundant dispensers loaded with a same fluid" in lines 7-8.

Claims 1-33 are rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential structural cooperative relationships of elements, such omission amounting to a gap between the necessary structural connections. See MPEP § 2172.01. The omitted structural cooperative relationships are: the relationships between the claim elements of groups, sets, frames, series, paths and patterns.

### **Claim Rejections - 35 USC § 102**

9. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

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(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

10. Claims 1-33 are rejected under 35 U.S.C. 102(a, e) as being anticipated by Kumar et al., US 6,283,572, (9/4/01: 3/4/97; of record, IDS entered 10/31/2006).

The claims of the invention set forth methods that utilize a set of non-error redundant dispensers to correct identified error dispensers. The methods claimed generally comprise the steps of loading each set of redundant dispensers with the same fluid; dispensing drops from the dispensers to identify an error; moving first dispensers or a frame of first dispensers along a selected path while dispensing only from non-error dispensers, and moving a redundant dispenser or frame with redundant dispensers along the selected path while dispensing drops from non-error redundant dispensers in the same set as the error first dispensers.

Kumar et al., US 6,283,572, throughout the patent and especially in the background of invention, col. 1, lines 43-50, teach that an inkjet printer prints ink dots at particular locations of an array, thereby reading on fabricating a chemical array. Kumar et al., at col. 7, line 23-col. 8, line 56, Figure 7, Tables I and II, disclose methods comprising redundant nozzles, wherein each nozzle is tested (col. 6, line 15-col. 7, line 8); and wherein malfunctioning dispensers are replaced by redundant dispensers. Kumar et al., col. 1, line 61-col. 2, line 10, teaches pulse inkjet dispensers.



### Claim Rejections - 35 USC § 103

11. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

12. Claims 1-33 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Tisone et al., US 6,063,339**, (of record), and in view of **Hackleman, US 5,640,183**, (of



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record, IDS entered 10/31/2006), **Anderson US 6,076,910**, (of record, IDS entered 10/31/2006) and **Schultz et al., US 5,985,356**.

The claims are drawn to methods of fabricating a chemical array using: a head system with multiple groups of drop dispensers; a transport system to move the head system with respect to a substrate; a processor to dispense droplets from dispensers during operation of the transport system, in a pattern along a selected path for each group; the method comprising: a) loading the dispensers with fluid such that each dispenser group has at least one set of redundant dispensers loaded with a same fluid; b) dispensing drops from the dispensers to identify an error in one or more dispensers; c) moving a first dispenser of each set in each group along the selected path for that group while dispensing drops from non-error first dispensers of the sets in at least part of the pattern along the selected path for each group; d) moving a second dispenser of the sets in each group along the selected path for that group while dispensing drops from a non-error second dispenser of a set having an identified error first dispenser, in at least part of the pattern for the selected path of the first group; and e) repeating (a) through (d) at least once; wherein the array is fabricated; and variations thereof.

**Tisone et al., US 6,063,339**, throughout the patent and abstract, and at col. 1, lines 10-17, col. 25, line 40-col. 26, line 7, disclose a method of fabricating a chemical array comprising using: a head system with multiple groups of drop dispensers, (col. 7, lines 61-67, col. 22, lines 16-31); a transport system to move the head system with respect to a substrate, (e.g., col. 7, lines 54-67); a processor to dispense droplets from dispensers during operation of the transport system, in a pattern along a selected path

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for each group, (e.g., col. 7, lines 61-67, col. 11, line 50-col. 14, line 6, col. 22, lines 16-47, col. 24, lines 6-12).

Tisone et al., at col. 9, lines 7-10, col. 10, lines 63-65, col. 14, line 63-65, disclose the use of the dispensing apparatus as suitable in inkjet printing applications. Tisone et al. disclose a method and apparatus for forming an array (Abstract; col. 3, line 63 to col. 4, line 13). The apparatus comprises a dispensing head (head system) mounted on or in association with a gantry (transport system), and a controller (col. 7, line 8 to col. 8, line 55). The apparatus further comprises multiple dispensing head (col. 7, lines 61-64; col. 22, lines 16-31). The method comprises the steps of loading the dispenser with a solution, dispensing droplets from the dispensers onto the substrate, and repeating the dispensing sequence steps to form an array (col. 7 line 8 to col. 8, line 55; col. 22, line 48 to col. 23, line 12). The method further comprise of the controller would determine a phase adjustment for each dispense cycle either before or during production such that a high degree of accuracy, precision, and repeatability is attained (i.e. detecting any error made by the dispenser and taking corrective measurement) (col. 8, lines 48-55).

Tisone et al., does not disclose methods comprising error identification and correction by the use of redundant dispensers.

**Hackleman, US 5,640,183**, throughout the patent and abstract, disclose a method and apparatus for ink-jet printing providing a redundancy strategy that includes two different nozzles of a given array in order to compensate for improperly operating or inoperable nozzles, (col. 2, lines 7-25).

Hackleman disclose ink jet printing comprising: a) loading the dispensers with fluid such that each dispenser group has at least one set of redundant dispensers, (e.g., col. 1, lines 35-50, col. 2, lines 30-37) loaded with ink, reading on "a same fluid", (e.g., col. 1, lines 36-50; col.2, lines 19-24); b) dispensing drops from the dispensers to identify an error in one or more dispensers, (Hackleman at col. 3, lines 59-67, describing an "inoperative nozzle" and a "pixel left un-dotted"); c) moving a first dispenser of each set in each group along the selected path for that group while dispensing drops from non-error first dispensers of the sets in at least part of the pattern along the selected path for each group (e.g., col. 4, lines 50-61); d) moving a second dispenser of the sets in each group along the selected path for that group while dispensing drops from a non-error second dispenser of a set having an identified error first dispenser, in at least part of the pattern for the selected path of the first group, (col. 2, lines 38-42); and e) repeating (a) through (d) at least once, (col. 4, lines 4-18); wherein the array is fabricated; and variations thereof.

Hackleman, at col. 3, lines 55-58, teach that redundancy is afforded by providing additional nozzles, such as "six extra nozzles, three at each end of the column as shown in FIG 5.

Hackleman teaches the use of redundant nozzles is desirable, (col. 2, lines 30-61), including that it is advantageous to minimize the effects of defective nozzles on print quality, (col. 2, lines 50-51). Hackleman, at col. 3, line 40-col. 4, line 68, Figures 4 and 5 teach groups and sets of nozzles, reading on dispensers, that form dispenser frames, that move along selected paths, e.g., as in Figure 6.

**Anderson US 6076910**, throughout the patent and especially in the summary of invention, col.s 1-2, and claim 13, discloses secondary redundant nozzles, (col. 2, lines 5-6), wherein each nozzle is tested (col. 2, lines 33-34), and if inoperable, then the associated nozzle "does double duty". Thus if a nozzle fails and associated nozzle is operable, all of the data to be printed by the nozzle pair will be printed during normal mode operation. Anderson, at col. 2, lines 31-37, discloses a nozzle testing station to detect if each nozzle is operable.

Anderson states that "[b]y adding redundant nozzles, nozzle column length has not been substantially increased. This is an advantage as print misalignment resulting from nozzle misalignment becomes more noticeable as nozzle column length increases." col. 2, lines 38-42. This allows for increased printing speed and improved print quality (see col.1, lines 62-63).

**Schultz et al., US 5,985,356**, throughout the patent, and at the abstract, disclose methods for preparing chemical arrays on substrates. Schultz et al., at col. 4, lines 1-17, disclose delivery by ink-jet printing technology of various substances and reactants in order to produce arrays on substrates. Shultz et al., at col. 10, line 60-col. 11, line 8, teach dispensing droplets using convention ink-jet printers that include pulse pressure type dispenser systems, reading on dispensers that are pulse jets, as in claims 4, 20, and 30. Schultz et al., at col. 20, line 18-col. 22, line 37, in considering using a ink-jet dispenser to make the array, contemplate the minor modification of simply substituting a reactant containing solution for ink, (col. 20, lines 50-52).

Schultz et al., state:

Moreover, although the foregoing discussion refers to a single nozzle, it will be readily apparent to those of skill in the art that ink-jet printers having multiple nozzles can be used to deliver multiple reactant components to a single predefined region on the substrate or, alternatively, to multiple predefined regions on the substrate. In addition, as improvements are made in field of ink-jet printers, such improvements can be used in the methods of the present invention.

Schultz et al., at col. 21, lines 56-64. Thus Schultz et al., look to further improvements in the ink-jet printer technology, including multiple nozzles, for use in making arrays.

It would have been prima facie obvious to a person of ordinary skill in the art at the time the invention was made to combine methods comprising dispenser technology include the step of identifying an error dispenser as taught by Tisone et al. in the method of Hackleman and Anderson; and wherein the dispensers are pulse jets, as explicitly taught by Schultz et al.

One of ordinary skill in the art would have been motivated to include the step of identifying an error dispenser in the method of Tisone et al. for the advantage of providing an apparatus dispenser system comprising redundant dispensers, as taught by Hackleman, and wherein drops are dispensed to identify an error in a dispenser, as taught by Anderson, because it would be desirable to assure that all data will be printed through the use of an operable, redundant nozzle that is paired with and redundant to an identified, inoperable nozzle, as taught by Anderson at col. 2, lines 32-38. Shultz et al., teach and suggest the use of pulse jet dispensers because pulse jet dispensers are able to deliver droplet volumes as small as 5 picoliters and are capable of manual or robotic automated control.

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One of ordinary skill in the art would have had a reasonable expectation of success in combining the teachings of Tisone et al., Hackleman and Anderson, because redundancy strategies were within the level of skill in the prior art and because Schultz et al., taught to look to further improvements in the ink-jet printer technology for use in making arrays.

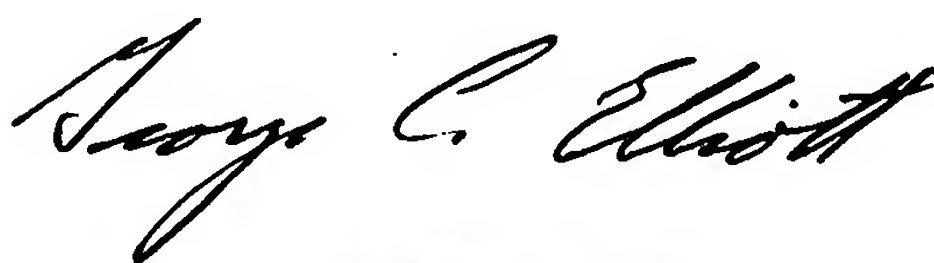
### **Conclusion**

13. Claims 1-33 are rejected.

14. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mark Shibuya, whose telephone number is (571) 272-0806. The examiner can normally be reached on M-F, 8:30AM-5:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Dr. James Schultz can be reached on (571) 272-0763. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



George C. Elliott, Ph.D.  
Director  
Technology Center 1600



Mark L. Shibuya, Ph.D.  
Primary Examiner  
Art Unit 1639